

What I claim as my invention is:

1 1. A method of measuring propagation time of an optical fiber, comprising the
2 steps of:

3 (a) repetitively transmitting at a predetermined frequency a light pulse into a near
4 end of said optical fiber and detecting said light pulse after a propagation time at a far end
5 of said optical fiber;

6 (b) generating from said detected light pulse a propagation signal having a
7 predetermined voltage amplitude and a width corresponding to said propagation time;

8 (c) determining the average voltage of said propagation signal, wherein the ratio of
9 the average voltage to the predetermined voltage amplitude is equal to the ratio of said
10 propagation time to a predetermined period of transmitted light pulses;

11 (d) measuring said average voltage; and

12 (e) computing said propagation time by multiplying said predetermined period by
13 said ratio of measured average voltage to said predetermined voltage amplitude.

1 2. An apparatus for measuring propagation time of an optical fiber, comprising:
2 a source of stimulus pulses repeating at a predetermined frequency and having a
3 predetermined time period between pulses;

4 an optical transmitter responsive to said stimulus pulses for repetitively transmitting
5 a light pulse into a near end of said optical fiber;

6 an optical detector which detects said light pulse after a propagation time at a far
7 end of said optical fiber and generates a detection signal in response thereto;

8 a logic circuit responsive to said stimulus pulses and said detection signal for
9 generating a propagation signal having a predetermined voltage amplitude and a width
10 corresponding to said propagation time;

11 an averaging circuit coupled to said logic circuit for determining the d.c. average
12 voltage of said propagation signal, wherein the ratio of the d.c. average voltage to the
13 predetermined voltage amplitude is equal to the ratio of said propagation time to said
14 predetermined period of said stimulus light pulses;

15 a measurement circuit coupled to said averaging circuit for measuring said d.c.
16 average voltage; and

17 a processor coupled to said measurement circuit for computing said propagation
18 time by multiplying said predetermined period by said ratio of measured average voltage
19 to said predetermined voltage amplitude.

1 3. An apparatus in accordance with claim 2 wherein said source of stimulus pulses is a
2 clock associated with said processor.

1 4. An apparatus in accordance with claim 2 wherein said averaging circuit is a
2 filter.

1 5. An apparatus in accordance with claim 2 wherein said measurement circuit is
2 an analog to digital converter.

1 6. An optical fiber propagation time measurement circuit, comprising:
2 a microprocessor having a clock for generating stimulus signals having a
3 predetermined frequency and a predetermined time period between stimulus signals;
4 an optical transmitter coupled to said microprocessor for receiving said stimulus
5 signals and transmitting in response thereto light pulses into one end of an optical fiber;
6 a detector coupled to an opposite end of said optical fiber for detecting after a
7 propagation time said light pulses and generating detection signals in response thereto;
8 a logic circuit responsive to both said stimulus signals and said detection signals
9 and generating a propagation signal having a predetermined amplitude and a width
10 corresponding to said propagation time;
11 a filter coupled to said logic circuit for generating a d.c. average voltage
12 proportional to said propagation time; and
13 an analog to digital converter for measuring said d.c. average voltage,

14 wherein said microprocessor is coupled to said analog to digital converter and
15 computes said propagation time as a function of a ratio of measured d.c. average voltage
16 to said predetermined amplitude.